



Sequence Listing

<110> Joh-E IKEDA  
Kenji YAMAMOTO

<120> APOPTOSIS INHIBITORY PROTEIN, GENE ENCODING THE PROTEIN  
AND CDNA THEREOF

<130> 2003-0980/WMC/00653

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<141> 2003-07-29

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<151> 2000-11-06

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<151> 1999-01-29

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<170> PatentIn Ver. 2.0

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<211> 1403

<212> PRT

<213> Homo sapiens

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Gln Leu Ala Lys Glu Leu Glu Glu Glu Gln Lys Glu Arg Ala Lys  
35 40 45  
Met Gln Lys Gly Tyr Asn Ser Gln Met Arg Ser Glu Ala Lys Arg Leu  
50 55 60  
Lys Thr Phe Val Thr Tyr Glu Pro Tyr Ser Ser Trp Ile Pro Gln Glu  
65 70 75 80  
Met Ala Ala Ala Gly Phe Tyr Phe Thr Gly Val Lys Ser Gly Ile Gln  
85 90 95  
Cys Phe Cys Cys Ser Leu Ile Leu Phe Gly Ala Gly Leu Thr Arg Leu  
100 105 110  
Pro Ile Glu Asp His Lys Arg Phe His Pro Asp Cys Gly Phe Leu Leu  
115 120 125  
Asn Lys Asp Val Gly Asn Ile Ala Lys Tyr Asp Ile Arg Val Lys Asn  
130 135 140  
Leu Lys Ser Arg Leu Arg Gly Gly Lys Met Arg Tyr Gln Glu Glu Glu  
145 150 155 160  
Ala Arg Leu Ala Ser Phe Arg Asn Trp Pro Phe Tyr Val Gln Gly Ile  
165 170 175  
Ser Pro Cys Val Leu Ser Glu Ala Gly Phe Val Phe Thr Gly Lys Gln  
180 185 190  
Asp Thr Val Gln Cys Phe Ser Cys Gly Gly Cys Leu Gly Asn Trp Glu  
195 200 205  
Glu Gly Asp Asp Pro Trp Lys Glu His Ala Lys Trp Phe Pro Lys Cys  
210 215 220  
Glu Phe Leu Arg Ser Lys Lys Ser Ser Glu Glu Ile Thr Gln Tyr Ile  
225 230 235 240  
Gln Ser Tyr Lys Gly Phe Val Asp Ile Thr Gly Glu His Phe Val Asn  
245 250 255  
Ser Trp Val Gln Arg Glu Leu Pro Met Ala Ser Ala Tyr Cys Asn Asp  
260 265 270  
Ser Ile Phe Ala Tyr Glu Glu Leu Arg Leu Asp Ser Phe Lys Asp Trp  
275 280 285

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Pro | Arg | Glu | Ser | Ala | Val | Gly | Val | Ala | Ala | Leu | Ala | Lys | Ala | Gly | Leu |
|     | 290 |     |     |     |     | 295 |     |     |     |     | 300 |     |     |     |     |
| Phe | Tyr | Thr | Gly | Ile | Lys | Asp | Ile | Val | Gln | Cys | Phe | Ser | Cys | Gly | Gly |
| 305 |     |     |     | 310 |     |     |     |     |     | 315 |     |     |     |     | 320 |
| Cys | Leu | Glu | Lys | Trp | Gln | Glu | Gly | Asp | Asp | Pro | Leu | Asp | Asp | His | Thr |
|     |     |     | 325 |     |     |     |     |     | 330 |     |     |     |     | 335 |     |
| Arg | Cys | Phe | Pro | Asn | Cys | Pro | Phe | Leu | Gln | Asn | Met | Lys | Ser | Ser | Ala |
|     |     |     | 340 |     |     |     |     | 345 |     |     |     |     | 350 |     |     |
| Glu | Val | Thr | Pro | Asp | Leu | Gln | Ser | Arg | Gly | Glu | Leu | Cys | Glu | Leu | Leu |
|     |     | 355 |     |     |     |     | 360 |     |     |     |     | 365 |     |     |     |
| Glu | Thr | Thr | Ser | Glu | Ser | Asn | Leu | Glu | Asp | Ser | Ile | Ala | Val | Gly | Pro |
|     | 370 |     |     |     |     | 375 |     |     |     |     | 380 |     |     |     |     |
| Ile | Val | Pro | Glu | Met | Ala | Gln | Gly | Glu | Ala | Gln | Trp | Phe | Gln | Glu | Ala |
| 385 |     |     |     |     | 390 |     |     |     |     | 395 |     |     |     |     | 400 |
| Lys | Asn | Leu | Asn | Glu | Gln | Leu | Arg | Ala | Ala | Tyr | Thr | Ser | Ala | Ser | Phe |
|     |     |     | 405 |     |     |     |     | 410 |     |     |     |     |     | 415 |     |
| Arg | His | Met | Ser | Leu | Leu | Asp | Ile | Ser | Ser | Asp | Leu | Ala | Thr | Asp | His |
|     |     |     | 420 |     |     |     |     | 425 |     |     |     |     | 430 |     |     |
| Leu | Leu | Gly | Cys | Asp | Leu | Ser | Ile | Ala | Ser | Lys | His | Ile | Ser | Lys | Pro |
|     |     | 435 |     |     |     |     | 440 |     |     |     |     | 445 |     |     |     |
| Val | Gln | Glu | Pro | Leu | Val | Leu | Pro | Glu | Val | Phe | Gly | Asn | Leu | Asn | Ser |
|     | 450 |     |     |     |     | 455 |     |     |     |     | 460 |     |     |     |     |
| Val | Met | Cys | Val | Glu | Gly | Glu | Ala | Gly | Ser | Gly | Lys | Thr | Val | Leu | Leu |
| 465 |     |     |     |     | 470 |     |     |     |     | 475 |     |     |     |     | 480 |
| Lys | Lys | Ile | Ala | Phe | Leu | Trp | Ala | Ser | Gly | Cys | Cys | Pro | Leu | Leu | Asn |
|     |     |     | 485 |     |     |     |     |     | 490 |     |     |     |     | 495 |     |
| Arg | Phe | Gln | Leu | Val | Phe | Tyr | Leu | Ser | Leu | Ser | Ser | Thr | Arg | Pro | Asp |
|     |     |     | 500 |     |     |     |     | 505 |     |     |     |     | 510 |     |     |
| Glu | Gly | Leu | Ala | Ser | Ile | Ile | Cys | Asp | Gln | Leu | Leu | Glu | Lys | Glu | Gly |
|     |     | 515 |     |     |     |     | 520 |     |     |     |     | 525 |     |     |     |
| Ser | Val | Thr | Glu | Met | Cys | Met | Arg | Asn | Ile | Ile | Gln | Gln | Leu | Lys | Asn |
|     | 530 |     |     |     |     | 535 |     |     |     |     | 540 |     |     |     |     |
| Gln | Val | Leu | Phe | Leu | Leu | Asp | Asp | Tyr | Lys | Glu | Ile | Cys | Ser | Ile | Pro |
| 545 |     |     |     |     | 550 |     |     |     |     | 555 |     |     |     |     | 560 |
| Gln | Val | Ile | Gly | Lys | Leu | Ile | Gln | Lys | Asn | His | Leu | Ser | Arg | Thr | Cys |
|     |     |     | 565 |     |     |     |     | 570 |     |     |     |     |     | 575 |     |
| Leu | Leu | Ile | Ala | Val | Arg | Thr | Asn | Arg | Ala | Arg | Asp | Ile | Arg | Arg | Tyr |
|     |     |     | 580 |     |     |     |     | 585 |     |     |     |     | 590 |     |     |
| Leu | Glu | Thr | Ile | Leu | Glu | Ile | Lys | Ala | Phe | Pro | Phe | Tyr | Asn | Thr | Val |
|     |     | 595 |     |     |     |     | 600 |     |     |     |     | 605 |     |     |     |
| Cys | Ile | Leu | Arg | Lys | Leu | Phe | Ser | His | Asn | Met | Thr | Arg | Leu | Arg | Lys |
|     | 610 |     |     |     |     | 615 |     |     |     |     | 620 |     |     |     |     |
| Phe | Met | Val | Tyr | Phe | Gly | Lys | Asn | Gln | Ser | Leu | Gln | Lys | Ile | Gln | Lys |
| 625 |     |     |     |     | 630 |     |     |     |     | 635 |     |     |     |     | 640 |
| Thr | Pro | Leu | Phe | Val | Ala | Ala | Ile | Cys | Ala | His | Trp | Phe | Gln | Tyr | Pro |
|     |     |     | 645 |     |     |     |     |     | 650 |     |     |     |     | 655 |     |
| Phe | Asp | Pro | Ser | Phe | Asp | Asp | Val | Ala | Val | Phe | Lys | Ser | Tyr | Met | Glu |
|     |     |     | 660 |     |     |     |     | 665 |     |     |     |     | 670 |     |     |
| Arg | Leu | Ser | Leu | Arg | Asn | Lys | Ala | Thr | Ala | Glu | Ile | Leu | Lys | Ala | Thr |
|     |     | 675 |     |     |     |     | 680 |     |     |     |     | 685 |     |     |     |
| Val | Ser | Ser | Cys | Gly | Glu | Leu | Ala | Leu | Lys | Gly | Phe | Phe | Ser | Cys | Cys |
|     | 690 |     |     |     |     | 695 |     |     |     |     | 700 |     |     |     |     |
| Phe | Glu | Phe | Asn | Asp | Asp | Leu | Ala | Glu | Ala | Gly | Val | Asp | Glu | Asp |     |
| 705 |     |     |     |     | 710 |     |     |     | 715 |     |     |     |     | 720 |     |
| Glu | Asp | Leu | Thr | Met | Cys | Leu | Met | Ser | Lys | Phe | Thr | Ala | Gln | Arg | Leu |
|     |     |     | 725 |     |     |     |     |     | 730 |     |     |     |     | 735 |     |
| Arg | Pro | Phe | Tyr | Arg | Phe | Leu | Ser | Pro | Ala | Phe | Gln | Glu | Phe | Leu | Ala |
|     |     |     | 740 |     |     |     |     | 745 |     |     |     |     | 750 |     |     |
| Gly | Met | Arg | Leu | Ile | Glu | Leu | Leu | Asp | Ser | Asp | Arg | Gln | Glu | His | Gln |
|     |     | 755 |     |     |     |     | 760 |     |     |     |     | 765 |     |     |     |
| Asp | Leu | Gly | Leu | Tyr | His | Leu | Lys | Gln | Ile | Asn | Ser | Pro | Met | Met | Thr |
|     | 770 |     |     |     |     | 775 |     |     |     |     | 780 |     |     |     |     |
| Val | Ser | Ala | Tyr | Asn | Asn | Phe | Leu | Asn | Tyr | Val | Ser | Ser | Leu | Pro | Ser |
| 785 |     |     |     |     | 790 |     |     |     |     | 795 |     |     |     |     | 800 |

Thr Lys Ala Gly Pro Lys Ile Val Ser His Leu Leu His Leu Val Asp  
 805 810 815  
 Asn Lys Glu Ser Leu Glu Asn Ile Ser Glu Asn Asp Asp Tyr Leu Lys  
 820 825 830  
 His Gln Pro Glu Ile Ser Leu Gln Met Gln Leu Leu Arg Gly Leu Trp  
 835 840 845  
 Gln Ile Cys Pro Gln Ala Tyr Phe Ser Met Val Ser Glu His Leu Leu  
 850 855 860  
 Val Leu Ala Leu Lys Thr Ala Tyr Gln Ser Asn Thr Val Ala Ala Cys  
 865 870 875 880  
 Ser Pro Phe Val Leu Gln Phe Leu Gln Gly Arg Thr Leu Thr Leu Gly  
 885 890 895  
 Ala Leu Asn Leu Gln Tyr Phe Phe Asp His Pro Glu Ser Leu Ser Leu  
 900 905 910  
 Leu Arg Ser Ile His Phe Pro Ile Arg Gly Asn Lys Thr Ser Pro Arg  
 915 920 925  
 Ala His Phe Ser Val Leu Glu Thr Cys Phe Asp Lys Ser Gln Val Pro  
 930 935 940  
 Thr Ile Asp Gln Asp Tyr Ala Ser Ala Phe Glu Pro Met Asn Glu Trp  
 945 950 955 960  
 Glu Arg Asn Leu Ala Glu Lys Glu Asp Asn Val Lys Ser Tyr Met Asp  
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 Met Gln Arg Arg Ala Ser Pro Asp Leu Ser Thr Gly Tyr Trp Lys Leu  
 980 985 990  
 Ser Pro Lys Gln Tyr Lys Ile Pro Cys Leu Glu Val Asp Val Asn Asp  
 995 1000 1005  
 Ile Asp Val Val Gly Gln Asp Met Leu Glu Ile Leu Met Thr Val Phe  
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 Ser Ala Ser Gln Arg Ile Glu Leu His Leu Asn His Ser Arg Gly Phe  
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 Lys Cys Ser Ile Ser Lys Leu Glu Leu Ser Ala Ala Glu Gln Glu Leu  
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 1075 1080 1085  
 Gln Ser Gln Asp Gln Ile Phe Pro Asn Leu Asp Lys Phe Leu Cys Leu  
 1090 1095 1100  
 Lys Glu Leu Ser Val Asp Leu Glu Gly Asn Ile Asn Val Phe Ser Val  
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 Ile Pro Glu Glu Phe Pro Asn Phe His His Met Glu Lys Leu Leu Ile  
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 Gln Ile Ser Ala Glu Tyr Asp Pro Ser Lys Leu Val Lys Leu Ile Gln  
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 Asn Ser Pro Asn Leu His Val Phe His Leu Lys Cys Asn Phe Phe Ser  
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 Asp Phe Gly Ser Leu Met Thr Met Leu Val Ser Cys Lys Lys Leu Thr  
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 Tyr Arg Val Ala Lys Leu Ile Ile Gln Gln Cys Gln Gln Leu His Cys  
 1250 1255 1260  
 Leu Arg Val Leu Ser Phe Phe Lys Thr Leu Asn Asp Asp Ser Val Val  
 1265 1270 1275 1280  
 Glu Ile Ala Lys Val Ala Ile Ser Gly Gly Phe Gln Lys Leu Glu Asn  
 1285 1290 1295  
 Leu Lys Leu Ser Ile Asn His Lys Ile Thr Glu Glu Gly Tyr Arg Asn  
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 Ser Arg His Phe Thr Glu Cys Ile Lys Ala Gln Ala Thr Thr Val Lys  
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 1345 1350 1355 1360  
 Met Leu Ser Trp Leu Leu Asp Ala Asp Asp Ile Ala Leu Leu Asn Val  
 1365 1370 1375  
 Met Lys Glu Arg His Pro Gln Ser Lys Tyr Leu Thr Ile Leu Gln Lys  
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 Trp Ile Leu Pro Phe Ser Pro Ile Ile Gln Lys  
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 tggggacttc gtctgggatt ccaaggtgca ttcattgcaa agttccttaa atattttctc 180  
 actgcttcct actaaaggac ggacagagca tttgttcttc agccacatac tttccttcca 240  
 ctggccagca ttctctctta ttagactaga actgtggata aacctcagaa a atg gcc 297  
 Met Ala  
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 acc cag cag aaa gcc tct gac gag agg atc tcc cag ttt gat cac aat 345  
 Thr Gln Gln Lys Ala Ser Asp Glu Arg Ile Ser Gln Phe Asp His Asn  
 5 10 15  
 ttg ctg cca gag ctg tct gct ctt ctg ggc cta gat gca gtt cag ttg 393  
 Leu Leu Pro Glu Leu Ser Ala Leu Leu Gly Leu Asp Ala Val Gln Leu  
 20 25 30  
 gca aag gaa cta gaa gaa gag gag cag aag gag cga gca aaa atg cag 441  
 Ala Lys Glu Leu Glu Glu Glu Gln Lys Glu Arg Ala Lys Met Gln  
 35 40 45 50  
 aaa ggc tac aac tct caa atg cgc agt gaa gca aaa agg tta aag act 489  
 Lys Gly Tyr Asn Ser Gln Met Arg Ser Glu Ala Lys Arg Leu Lys Thr  
 55 60 65  
 ttt gtg act tat gag ccg tac agc tca tgg ata cca cag gag atg gcg 537  
 Phe Val Thr Tyr Glu Pro Tyr Ser Ser Trp Ile Pro Gln Glu Met Ala  
 70 75 80  
 gcc gct ggg ttt tac ttc act ggg gta aaa tct ggg att cag tgc ttc 585  
 Ala Ala Gly Phe Tyr Phe Thr Gly Val Lys Ser Gly Ile Gln Cys Phe  
 85 90 95  
 tgc tgt agc cta atc ctc ttt ggt gcc ggc ctc acg aga ctc ccc ata 633  
 Cys Ser Leu Ile Leu Phe Gly Ala Gly Leu Thr Arg Leu Pro Ile  
 100 105 110  
 gaa gac cac aag agg ttt cat cca gat tgt ggg ttc ctt ttg aac aag 681  
 Glu Asp His Lys Arg Phe His Pro Asp Cys Gly Phe Leu Leu Asn Lys  
 115 120 125 130  
 gat gtt ggt aac att gcc aag tac gac ata agg gtg aag aat ctg aag 729  
 Asp Val Gly Asn Ile Ala Lys Tyr Asp Ile Arg Val Lys Asn Leu Lys  
 135 140 145  
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 Ser Arg Leu Arg Gly Gly Lys Met Arg Tyr Gln Glu Glu Glu Ala Arg  
 150 155 160

|                   |                   |                   |                   |                   |                   |                   |                   |                   |                   |                   |                   |                   |                   |                   |                   |      |
|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|------|
| ctt<br>Leu        | gca<br>Ala        | tcc<br>Ser<br>165 | ttc<br>Phe        | agg<br>Arg        | aac<br>Asn        | tgg<br>Trp        | cca<br>Pro<br>170 | ttt<br>Phe        | tat<br>Tyr        | gtc<br>Val        | caa<br>Gln        | ggg<br>Gly<br>175 | ata<br>Ile        | tcc<br>Ser        | cct<br>Pro        | 825  |
| tgt<br>Cys        | gtg<br>Val<br>180 | ctc<br>Leu        | tca<br>Ser        | gag<br>Glu        | gct<br>Ala        | ggc<br>Gly<br>185 | ttt<br>Phe        | gtc<br>Val        | ttt<br>Phe        | aca<br>Thr        | ggt<br>Gly<br>190 | aaa<br>Lys        | cag<br>Gln        | gac<br>Asp        | acg<br>Thr        | 873  |
| gta<br>Val<br>195 | cag<br>Gln        | tgt<br>Cys        | ttt<br>Phe        | tcc<br>Ser        | tgt<br>Cys<br>200 | ggg<br>Gly        | gga<br>Gly        | tgt<br>Cys        | tta<br>Leu        | gga<br>Gly<br>205 | aat<br>Asn        | tgg<br>Trp        | gaa<br>Glu        | gaa<br>Glu        | gga<br>Gly<br>210 | 921  |
| gat<br>Asp        | gat<br>Asp        | cct<br>Pro        | tgg<br>Trp        | aag<br>Lys<br>215 | gaa<br>Glu        | cat<br>His        | gcc<br>Ala        | aaa<br>Lys        | tgg<br>Trp<br>220 | ttc<br>Phe        | ccc<br>Pro        | aaa<br>Lys        | tgt<br>Cys        | gaa<br>Glu<br>225 | ttt<br>Phe        | 969  |
| ctt<br>Leu        | cgg<br>Arg        | agt<br>Ser        | aag<br>Lys<br>230 | aaa<br>Lys        | tcc<br>Ser        | tca<br>Ser        | gag<br>Glu        | gaa<br>Glu<br>235 | att<br>Ile        | acc<br>Thr        | cag<br>Gln        | tat<br>Tyr        | att<br>Ile<br>240 | caa<br>Gln        | agc<br>Ser        | 1017 |
| tac<br>Tyr        | aag<br>Lys        | gga<br>Gly<br>245 | ttt<br>Phe        | gtt<br>Val        | gac<br>Asp        | ata<br>Ile        | acg<br>Thr<br>250 | gga<br>Gly        | gaa<br>Glu        | cat<br>His        | ttt<br>Phe        | gtg<br>Val<br>255 | aat<br>Asn        | tcc<br>Ser        | tgg<br>Trp        | 1065 |
| gtc<br>Val        | cag<br>Gln<br>260 | aga<br>Arg        | gaa<br>Glu        | tta<br>Leu        | cct<br>Pro        | atg<br>Met<br>265 | gca<br>Ala        | tca<br>Ser        | gct<br>Ala        | tat<br>Tyr        | tgc<br>Cys<br>270 | aat<br>Asn        | gac<br>Asp        | agc<br>Ser        | atc<br>Ile        | 1113 |
| ttt<br>Phe<br>275 | gct<br>Ala        | tac<br>Tyr        | gaa<br>Glu        | gaa<br>Glu        | cta<br>Leu<br>280 | cgg<br>Arg        | ctg<br>Leu        | gac<br>Asp        | tct<br>Ser        | ttt<br>Phe<br>285 | aag<br>Lys        | gac<br>Asp        | tgg<br>Trp        | ccc<br>Pro        | cgg<br>Arg<br>290 | 1161 |
| gaa<br>Glu        | tca<br>Ser        | gct<br>Ala        | gtg<br>Val        | gga<br>Gly<br>295 | gtt<br>Val        | gca<br>Ala        | gca<br>Ala        | ctg<br>Leu        | gcc<br>Ala<br>300 | aaa<br>Lys        | gca<br>Ala        | ggg<br>Gly        | ctt<br>Leu        | ttc<br>Phe<br>305 | tac<br>Tyr        | 1209 |
| aca<br>Thr        | ggg<br>Gly        | ata<br>Ile        | aag<br>Lys<br>310 | gac<br>Asp        | atc<br>Ile        | gtc<br>Val        | cag<br>Gln        | tgc<br>Cys<br>315 | ttt<br>Phe        | tcc<br>Ser        | tgt<br>Cys        | gga<br>Gly        | ggg<br>Gly<br>320 | tgt<br>Cys        | tta<br>Leu        | 1257 |
| gag<br>Glu        | aaa<br>Lys        | tgg<br>Trp<br>325 | cag<br>Gln        | gaa<br>Glu        | ggg<br>Gly        | gat<br>Asp        | gac<br>Asp<br>330 | cca<br>Pro        | tta<br>Leu        | gac<br>Asp        | gat<br>Asp        | cac<br>His<br>335 | acc<br>Thr        | aga<br>Arg        | tgt<br>Cys        | 1305 |
| ttt<br>Phe        | ccc<br>Pro<br>340 | aat<br>Asn        | tgt<br>Cys        | cca<br>Pro        | ttt<br>Phe        | ctc<br>Leu<br>345 | caa<br>Gln        | aat<br>Asn        | atg<br>Met        | aag<br>Lys        | tcc<br>Ser<br>350 | tct<br>Ser        | gcg<br>Ala        | gaa<br>Glu        | gtg<br>Val        | 1353 |
| act<br>Thr<br>355 | cca<br>Pro        | gac<br>Asp        | ctt<br>Leu        | cag<br>Gln        | agc<br>Ser<br>360 | cgt<br>Arg        | ggg<br>Gly        | gaa<br>Glu        | ctt<br>Leu        | tgt<br>Cys<br>365 | gaa<br>Glu        | tta<br>Leu        | ctg<br>Leu        | gaa<br>Glu        | acc<br>Thr<br>370 | 1401 |
| aca<br>Thr        | agt<br>Ser        | gaa<br>Glu        | agc<br>Ser        | aat<br>Asn<br>375 | ctt<br>Leu        | gaa<br>Glu        | gat<br>Asp        | tca<br>Ser        | ata<br>Ile<br>380 | gca<br>Ala        | gtt<br>Val        | ggg<br>Gly        | cct<br>Pro        | ata<br>Ile<br>385 | gtg<br>Val        | 1449 |
| cca<br>Pro        | gaa<br>Glu        | atg<br>Met        | gca<br>Ala<br>390 | cag<br>Gln        | ggg<br>Gly        | gaa<br>Glu        | gcc<br>Ala        | cag<br>Gln<br>395 | tgg<br>Trp        | ttt<br>Phe        | caa<br>Gln        | gag<br>Glu        | gca<br>Ala<br>400 | aag<br>Lys        | aat<br>Asn        | 1497 |
| ctg<br>Leu        | aat<br>Asn        | gag<br>Glu<br>405 | cag<br>Gln        | ctg<br>Leu        | aga<br>Arg        | gca<br>Ala        | gct<br>Ala<br>410 | tat<br>Tyr        | acc<br>Thr        | agc<br>Ser        | gcc<br>Ala        | agt<br>Ser<br>415 | ttc<br>Phe        | cgc<br>Arg        | cac<br>His        | 1545 |
| atg<br>Met        | tct<br>Ser<br>420 | ttg<br>Leu        | ctt<br>Leu        | gat<br>Asp        | atc<br>Ile        | tct<br>Ser<br>425 | tcc<br>Ser        | gat<br>Asp        | ctg<br>Leu        | gcc<br>Ala        | acg<br>Thr<br>430 | gac<br>Asp        | cac<br>His        | ttg<br>Leu        | ctg<br>Leu        | 1593 |
| ggc<br>Gly<br>435 | tgt<br>Cys        | gat<br>Asp        | ctg<br>Leu        | tct<br>Ser        | att<br>Ile<br>440 | gct<br>Ala        | tca<br>Ser        | aaa<br>Lys        | cac<br>His        | atc<br>Ile<br>445 | agc<br>Ser        | aaa<br>Lys        | cct<br>Pro        | gtg<br>Val        | caa<br>Gln<br>450 | 1641 |
| gaa<br>Glu        | cct<br>Pro        | ctg<br>Leu        | gtg<br>Val        | ctg<br>Leu<br>455 | cct<br>Pro        | gag<br>Glu        | gtc<br>Val        | ttt<br>Phe        | ggc<br>Gly<br>460 | aac<br>Asn        | ttg<br>Leu        | aac<br>Asn        | tct<br>Ser        | gtc<br>Val<br>465 | atg<br>Met        | 1689 |
| tgt<br>Cys        | gtg<br>Val        | gag<br>Glu        | ggg<br>Gly<br>470 | gaa<br>Glu        | gct<br>Ala        | gga<br>Gly        | agt<br>Ser        | gga<br>Gly<br>475 | aag<br>Lys        | acg<br>Thr        | gtc<br>Val        | ctc<br>Leu        | ctg<br>Leu<br>480 | aag<br>Lys        | aaa<br>Lys        | 1737 |
| ata<br>Ile        | gct<br>Ala        | ttt<br>Phe<br>485 | ctg<br>Leu        | tgg<br>Trp        | gca<br>Ala        | tct<br>Ser        | gga<br>Gly<br>490 | tgc<br>Cys        | tgt<br>Cys        | ccc<br>Pro        | ctg<br>Leu        | tta<br>Leu<br>495 | aac<br>Asn        | agg<br>Arg        | ttc<br>Phe        | 1785 |
| cag               | ctg               | gtt               | ttc               | tac               | ctc               | tcc               | ctt               | agt               | tcc               | acc               | aga               | cca               | gac               | gag               | ggg               | 1833 |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| Gln | Leu | Val | Phe | Tyr | Leu | Ser | Leu | Ser | Ser | Thr | Arg | Pro | Asp | Glu | Gly |      |
| 500 |     |     |     |     |     | 505 |     |     |     |     | 510 |     |     |     |     |      |
| ctg | gcc | agt | atc | atc | tgt | gac | cag | ctc | cta | gag | aaa | gaa | gga | tct | gtt | 1881 |
| Leu | Ala | Ser | Ile | Ile | Cys | Asp | Gln | Leu | Leu | Glu | Lys | Glu | Gly | Ser | Val |      |
| 515 |     |     |     |     | 520 |     |     |     |     | 525 |     |     |     |     | 530 |      |
| act | gaa | atg | tgc | atg | agg | aac | att | atc | cag | cag | tta | aag | aat | cag | gtc | 1929 |
| Thr | Glu | Met | Cys | Met | Arg | Asn | Ile | Ile | Gln | Gln | Leu | Lys | Asn | Gln | Val |      |
|     |     |     |     | 535 |     |     |     |     | 540 |     |     |     |     | 545 |     |      |
| tta | ttc | ctt | tta | gat | gac | tac | aaa | gaa | ata | tgt | tca | atc | cct | caa | gtc | 1977 |
| Leu | Phe | Leu | Leu | Asp | Asp | Tyr | Lys | Glu | Ile | Cys | Ser | Ile | Pro | Gln | Val |      |
|     |     |     | 550 |     |     |     |     | 555 |     |     |     |     | 560 |     |     |      |
| ata | gga | aaa | ctg | att | caa | aaa | aac | cac | tta | tcc | cgg | acc | tgc | cta | ttg | 2025 |
| Ile | Gly | Lys | Leu | Ile | Gln | Lys | Asn | His | Leu | Ser | Arg | Thr | Cys | Leu | Leu |      |
|     |     | 565 |     |     |     |     | 570 |     |     |     |     | 575 |     |     |     |      |
| att | gct | gtc | cgt | aca | aac | agg | gcc | agg | gac | atc | cgc | cga | tac | cta | gag | 2073 |
| Ile | Ala | Val | Arg | Thr | Asn | Arg | Ala | Arg | Asp | Ile | Arg | Arg | Tyr | Leu | Glu |      |
|     | 580 |     |     |     |     | 585 |     |     |     |     | 590 |     |     |     |     |      |
| acc | att | cta | gag | atc | aaa | gca | ttt | ccc | ttt | tat | aat | act | gtc | tgt | ata | 2121 |
| Thr | Ile | Leu | Glu | Ile | Lys | Ala | Phe | Pro | Phe | Tyr | Asn | Thr | Val | Cys | Ile |      |
|     | 595 |     |     |     | 600 |     |     |     |     | 605 |     |     |     |     | 610 |      |
| tta | cgg | aag | ctc | ttt | tca | cat | aat | atg | act | cgt | ctg | cga | aag | ttt | atg | 2169 |
| Leu | Arg | Lys | Leu | Phe | Ser | His | Asn | Met | Thr | Arg | Leu | Arg | Lys | Phe | Met |      |
|     |     |     |     | 615 |     |     |     |     | 620 |     |     |     |     | 625 |     |      |
| gtt | tac | ttt | gga | aag | aac | caa | agt | ttg | cag | aag | ata | cag | aaa | act | cct | 2217 |
| Val | Tyr | Phe | Gly | Lys | Asn | Gln | Ser | Leu | Gln | Lys | Ile | Gln | Lys | Thr | Pro |      |
|     |     |     | 630 |     |     |     |     | 635 |     |     |     |     | 640 |     |     |      |
| ctc | ttt | gtg | gcg | gcg | atc | tgt | gct | cat | tgg | ttt | cag | tat | cct | ttt | gac | 2265 |
| Leu | Phe | Val | Ala | Ala | Ile | Cys | Ala | His | Trp | Phe | Gln | Tyr | Pro | Phe | Asp |      |
|     |     | 645 |     |     |     |     | 650 |     |     |     |     | 655 |     |     |     |      |
| cca | tcc | ttt | gat | gat | gtg | gct | gtt | ttc | aag | tcc | tat | atg | gaa | cgc | ctt | 2313 |
| Pro | Ser | Phe | Asp | Asp | Val | Ala | Val | Phe | Lys | Ser | Tyr | Met | Glu | Arg | Leu |      |
|     | 660 |     |     |     |     | 665 |     |     |     |     | 670 |     |     |     |     |      |
| tcc | tta | agg | aac | aaa | gcg | aca | gct | gaa | att | ctc | aaa | gca | act | gtg | tcc | 2361 |
| Ser | Leu | Arg | Asn | Lys | Ala | Thr | Ala | Glu | Ile | Leu | Lys | Ala | Thr | Val | Ser |      |
|     |     |     |     |     | 680 |     |     |     |     | 685 |     |     |     |     | 690 |      |
| tcc | tgt | ggt | gag | ctg | gcc | ttg | aaa | ggg | ttt | ttt | tca | tgt | tgc | ttt | gag | 2409 |
| Ser | Cys | Gly | Glu | Leu | Ala | Leu | Lys | Gly | Phe | Phe | Ser | Cys | Cys | Phe | Glu |      |
|     |     |     |     | 695 |     |     |     |     | 700 |     |     |     |     | 705 |     |      |
| ttt | aat | gat | gat | gat | ctc | gca | gaa | gca | ggg | gtt | gat | gaa | gat | gaa | gat | 2457 |
| Phe | Asn | Asp | Asp | Asp | Leu | Ala | Glu | Ala | Gly | Val | Asp | Glu | Asp | Glu | Asp |      |
|     |     |     | 710 |     |     |     |     | 715 |     |     |     |     | 720 |     |     |      |
| cta | acc | atg | tgc | ttg | atg | agc | aaa | ttt | aca | gcc | cag | aga | cta | aga | cca | 2505 |
| Leu | Thr | Met | Cys | Leu | Met | Ser | Lys | Phe | Thr | Ala | Gln | Arg | Leu | Arg | Pro |      |
|     |     | 725 |     |     |     |     | 730 |     |     |     |     | 735 |     |     |     |      |
| ttc | tac | cgg | ttt | tta | agt | cct | gcc | ttc | caa | gaa | ttt | ctt | gcg | ggg | atg | 2553 |
| Phe | Tyr | Arg | Phe | Leu | Ser | Pro | Ala | Phe | Gln | Glu | Phe | Leu | Ala | Gly | Met |      |
|     |     | 740 |     |     |     | 745 |     |     |     |     | 750 |     |     |     |     |      |
| agg | ctg | att | gaa | ctc | ctg | gat | tca | gat | agg | cag | gaa | cat | caa | gat | ttg | 2601 |
| Arg | Leu | Ile | Glu | Leu | Leu | Asp | Ser | Asp | Arg | Gln | Glu | His | Gln | Asp | Leu |      |
|     |     |     |     | 760 |     |     |     |     |     | 765 |     |     |     |     | 770 |      |
| gga | ctg | tat | cat | ttg | aaa | caa | atc | aac | tca | ccc | atg | atg | act | gta | agc | 2649 |
| Gly | Leu | Tyr | His | Leu | Lys | Gln | Ile | Asn | Ser | Pro | Met | Met | Thr | Val | Ser |      |
|     |     |     |     | 775 |     |     |     |     | 780 |     |     |     |     | 785 |     |      |
| gcc | tac | aac | aat | ttt | ttg | aac | tat | gtc | tcc | agc | ctc | cct | tca | aca | aaa | 2697 |
| Ala | Tyr | Asn | Asn | Phe | Leu | Asn | Tyr | Val | Ser | Ser | Leu | Pro | Ser | Thr | Lys |      |
|     |     |     | 790 |     |     |     |     | 795 |     |     |     |     | 800 |     |     |      |
| gca | ggg | ccc | aaa | att | gtg | tct | cat | ttg | ctc | cat | tta | gtg | gat | aac | aaa | 2745 |
| Ala | Gly | Pro | Lys | Ile | Val | Ser | His | Leu | Leu | His | Leu | Val | Asp | Asn | Lys |      |
|     |     | 805 |     |     |     |     |     |     |     |     |     | 815 |     |     |     |      |
| gag | tca | ttg | gag | aat | ata | tct | gaa | aat | gat | gac | tac | tta | aag | cac | cag | 2793 |
| Glu | Ser | Leu | Glu | Asn | Ile | Ser | Glu | Asn | Asp | Asp | Tyr | Leu | Lys | His | Gln |      |
|     |     | 820 |     |     |     | 825 |     |     |     |     | 830 |     |     |     |     |      |
| cca | gaa | att | tca | ctg | cag | atg | cag | tta | ctt | agg | gga | ttg | tgg | caa | att | 2841 |
| Pro | Glu | Ile | Ser | Leu | Gln | Met | Gln | Leu | Leu | Arg | Gly | Leu | Trp | Gln | Ile |      |

|                         |   |     |   |     |      |
|-------------------------|---|-----|---|-----|------|
| 835                     | tgt cca caa gct tac                         | 840 | ttt tca atg gtt tca gaa cat tta ctg gtt ctt | 850 | 2889 |
| Cys Pro Gln Ala Tyr     | Phe Ser Met Val Ser Glu His Leu Leu Val Leu |     |   |     |      |
|                         | 855   |     | 860   |     |      |
| gcc ctg aaa act gct tat | caa agc aac act gtt gct gcg tgt tct cca     |     |   |     | 2937 |
| Ala Leu Lys Thr Ala Tyr | Gln Ser Asn Thr Val Ala Ala Cys Ser Pro     |     |   |     |      |
|                         | 870   |     | 875   |     |      |
| ttt gtt ttg caa ttc ctt | caa ggg aga aca ctg act ttg ggt gcg ctt     |     |   |     | 2985 |
| Phe Val Leu Gln Phe Leu | Gln Gly Arg Thr Leu Thr Leu Gly Ala Leu     |     |   |     |      |
|                         | 885   |     | 890   |     |      |
| aac tta cag tac ttt ttc | gac cac cca gaa agc ttg tca ttg ttg agg     |     |   |     | 3033 |
| Asn Leu Gln Tyr Phe Phe | Asp His Pro Glu Ser Leu Ser Leu Leu Arg     |     |   |     |      |
|                         | 900   |     | 910   |     |      |
| agc atc cac ttc cca ata | cga gga aat aag aca tca ccc aga gca cat     |     |   |     | 3081 |
| Ser Ile His Phe Pro Ile | Arg Gly Asn Lys Thr Ser Pro Arg Ala His     |     |   |     |      |
|                         | 915   |     | 925   |     |      |
| ttt tca gtt ctg gaa aca | tgt ttt gac aaa tca cag gtg cca act ata     |     |   |     | 3129 |
| Phe Ser Val Leu Glu Thr | Cys Phe Asp Lys Ser Gln Val Pro Thr Ile     |     |   |     |      |
|                         | 935   |     | 940   |     |      |
| gat cag gac tat gct tct | gcc ttt gaa cct atg aat gaa tgg gag cga     |     |   |     | 3177 |
| Asp Gln Asp Tyr Ala Ser | Ala Phe Glu Pro Met Asn Glu Trp Glu Arg     |     |   |     |      |
|                         | 950   |     | 955   |     |      |
| aat tta gct gaa aaa gag | gat aat gta aag agc tat atg gat atg cag     |     |   |     | 3225 |
| Asn Leu Ala Glu Lys Glu | Asp Val Lys Ser Tyr Met Asp Met Gln         |     |   |     |      |
|                         | 965   |     | 970   |     |      |
| cgc agg gca tca cca gac | ctt agt act ggc tat tgg aaa ctt tct cca     |     |   |     | 3273 |
| Arg Arg Ala Ser Pro Asp | Leu Ser Thr Gly Tyr Trp Lys Leu Ser Pro     |     |   |     |      |
|                         | 985   |     | 990   |     |      |
| aag cag tac aag att ccc | tgt cta gaa gtc gat gtg aat gat att gat     |     |   |     | 3321 |
| Lys Gln Tyr Lys Ile Pro | Cys Leu Glu Val Asp Val Asn Asp Ile Asp     |     |   |     |      |
|                         | 1000  |     | 1005  |     |      |
| gtt gta ggc cag gat atg | ctt gag att cta atg aca gtt ttc tca gct     |     |   |     | 3369 |
| Val Val Gly Gln Asp Met | Leu Glu Ile Leu Met Thr Val Phe Ser Ala     |     |   |     |      |
|                         | 1015  |     | 1020  |     |      |
| tca cag cgc atc gaa ctc | cat tta aac cac agc aga ggc ttt ata gaa     |     |   |     | 3417 |
| Ser Gln Arg Ile Glu Leu | His Leu Asn His Ser Arg Gly Phe Ile Glu     |     |   |     |      |
|                         | 1030  |     | 1035  |     |      |
| agc atc cgc cca gct ctt | gag ctg tct aag gcc tct gtc acc aag tgc     |     |   |     | 3465 |
| Ser Ile Arg Pro Ala Leu | Glu Leu Ser Lys Ala Ser Val Thr Lys Cys     |     |   |     |      |
|                         | 1045  |     | 1050  |     |      |
| tcc ata agc aag ttg gaa | ctc agc gca gcc gaa cag gaa ctg ctt ctc     |     |   |     | 3513 |
| Ser Ile Ser Lys Leu Glu | Leu Ser Ala Ala Glu Gln Glu Leu Leu Leu     |     |   |     |      |
|                         | 1060  |     | 1065  |     |      |
| acc ctg cct tcc ctg gaa | tct ctt gaa gtc tca ggg aca atc cag tca     |     |   |     | 3561 |
| Thr Leu Pro Ser Leu Glu | Ser Leu Glu Val Ser Gly Thr Ile Gln Ser     |     |   |     |      |
|                         | 1075  |     | 1080  |     |      |
| caa gac caa atc ttt cct | aat ctg gat aag ttc ctg tgc ctg aaa gaa     |     |   |     | 3609 |
| Gln Asp Gln Ile Phe Pro | Asn Leu Asp Lys Phe Leu Cys Leu Lys Glu     |     |   |     |      |
|                         | 1095  |     | 1100  |     |      |
| ctg tct gtg gat ctg gag | ggc aat ata aat gtt ttt tca gtc att cct     |     |   |     | 3657 |
| Leu Ser Val Asp Leu Glu | Gly Asn Ile Asn Val Phe Ser Val Ile Pro     |     |   |     |      |
|                         | 1110  |     | 1115  |     |      |
| gaa gaa ttt cca aac ttc | cac cat atg gag aaa tta ttg atc caa att     |     |   |     | 3705 |
| Glu Glu Phe Pro Asn Phe | His His Met Glu Lys Leu Leu Ile Gln Ile     |     |   |     |      |
|                         | 1125  |     | 1130  |     |      |
| tca gct gag tat gat cct | tcc aaa cta gta aaa tta att caa aat tct     |     |   |     | 3753 |
| Ser Ala Glu Tyr Asp Pro | Ser Lys Leu Val Lys Leu Ile Gln Asn Ser     |     |   |     |      |
|                         | 1140  |     | 1145  |     |      |
| cca aac ctt cat gtt ttc | cat ctg aag tgt aac ttc ttt tcg gat ttt     |     |   |     | 3801 |
| Pro Asn Leu His Val Phe | His Leu Lys Cys Asn Phe Phe Ser Asp Phe     |     |   |     |      |
|                         | 1155  |     | 1160  |     |      |
| ggg tct ctc atg act atg | ctt gtt tcc tgt aag aaa ctc aca gaa att     |     |   |     | 3849 |
| Gly Ser Leu Met Thr Met | Leu Val Ser Cys Lys Lys Leu Thr Glu Ile     |     |   |     |      |
|                         | 1175  |     | 1180  |     |      |
|                         |   |     |   |     |      |

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Lys Thr Phe Val Thr Tyr Glu Pro Tyr Ser Ser Trp Ile Pro Gln Glu  
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Cys Phe Cys Cys Ser Leu Ile Leu Phe Gly Ala Gly Leu Thr Arg Leu  
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Pro Ile Glu Asp His Lys Arg Phe His Pro Asp Cys Gly Phe Leu Leu  
115 120 125  
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180 185 190  
Asp Thr Val Gln Cys Phe Ser Cys Gly Gly Cys Leu Gly Asn Trp Glu  
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Glu Gly Asp Asp Pro Trp Lys Glu His Ala Lys Trp Phe Pro Lys Cys  
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Glu Phe Leu Arg Ser Lys Lys Ser Ser Glu Glu Ile Thr Gln Tyr Ile  
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Gln Ser Tyr Lys Gly Phe Val Asp Ile Thr Gly Glu His Phe Val Asn  
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Ser Trp Val Gln Arg Glu Leu Pro Met Ala Ser Ala Tyr Cys Asn Asp  
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Ser Ile Phe Ala Tyr Glu Glu Leu Arg Leu Asp Ser Phe Lys Asp Trp  
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Pro Arg Glu Ser Ala Val Gly Val Ala Ala Leu Ala Lys Ala Gly Leu  
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Phe Tyr Thr Gly Ile Lys Asp Ile Val Gln Cys Phe Ser Cys Gly Gly  
305 310 315 320  
Cys Leu Glu Lys Trp Gln Glu Gly Asp Asp Pro Leu Asp Asp His Thr  
325 330 335  
Arg Cys Phe Pro Asn Cys Pro Phe Leu Gln Asn Met Lys Ser Ser Ala  
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Glu Val Thr Pro Asp Leu Gln Ser Arg Gly Glu Leu Cys Glu Leu Leu  
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Glu Thr Thr Ser Glu Ser Asn Leu Glu Asp Ser Ile Ala Val Gly Pro  
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Ile Val Pro Glu Met Ala Gln Gly Glu Ala Gln Trp Phe Gln Glu Ala  
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Lys Asn Leu Asn Glu Gln Leu Arg Ala Ala Tyr Thr Ser Ala Ser Phe  
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Arg His Met Ser Leu Leu Asp Ile Ser Asp Leu Ala Thr Asp His  
420 425 430

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Leu | Leu | Gly | Cys | Asp | Leu | Ser | Ile | Ala | Ser | Lys | His | Ile | Ser | Lys | Pro |
|     |     | 435 |     |     |     |     | 440 |     |     |     |     | 445 |     |     |     |
| Val | Gln | Glu | Pro | Leu | Val | Leu | Pro | Glu | Val | Phe | Gly | Asn | Leu | Asn | Ser |
|     | 450 |     |     |     |     | 455 |     |     |     |     | 460 |     |     |     |     |
| Val | Met | Cys | Val | Glu | Gly | Glu | Ala | Gly | Ser | Gly | Lys | Thr | Val | Leu | Leu |
| 465 |     |     |     | 470 |     |     |     |     |     | 475 |     |     |     |     | 480 |
| Lys | Lys | Ile | Ala | Phe | Leu | Trp | Ala | Ser | Gly | Cys | Cys | Pro | Leu | Leu | Asn |
|     |     |     |     | 485 |     |     |     |     | 490 |     |     |     |     | 495 |     |
| Arg | Phe | Gln | Leu | Val | Phe | Tyr | Leu | Ser | Leu | Ser | Ser | Thr | Arg | Pro | Asp |
|     |     |     | 500 |     |     |     |     | 505 |     |     |     |     | 510 |     |     |
| Glu | Gly | Leu | Ala | Ser | Ile | Ile | Cys | Asp | Gln | Leu | Leu | Glu | Lys | Glu | Gly |
|     |     | 515 |     |     |     |     | 520 |     |     |     |     | 525 |     |     |     |
| Ser | Val | Thr | Glu | Met | Cys | Met | Arg | Asn | Ile | Ile | Gln | Gln | Leu | Lys | Asn |
|     | 530 |     |     |     |     | 535 |     |     |     |     | 540 |     |     |     |     |
| Gln | Val | Leu | Phe | Leu | Leu | Asp | Asp | Tyr | Lys | Glu | Ile | Cys | Ser | Ile | Pro |
| 545 |     |     |     | 550 |     |     |     |     |     | 555 |     |     |     |     | 560 |
| Gln | Val | Ile | Gly | Lys | Leu | Ile | Gln | Lys | Asn | His | Leu | Ser | Arg | Thr | Cys |
|     |     |     |     | 565 |     |     |     |     | 570 |     |     |     |     | 575 |     |
| Leu | Leu | Ile | Ala | Val | Arg | Thr | Asn | Arg | Ala | Arg | Asp | Ile | Arg | Arg | Tyr |
|     |     |     | 580 |     |     |     |     | 585 |     |     |     |     | 590 |     |     |
| Leu | Glu | Thr | Ile | Leu | Glu | Ile | Lys | Ala | Phe | Pro | Phe | Tyr | Asn | Thr | Val |
|     |     | 595 |     |     |     |     | 600 |     |     |     |     | 605 |     |     |     |
| Cys | Ile | Leu | Arg | Lys | Leu | Phe | Ser | His | Asn | Met | Thr | Arg | Leu | Arg | Lys |
|     | 610 |     |     |     |     | 615 |     |     |     |     | 620 |     |     |     |     |
| Phe | Met | Val | Tyr | Phe | Gly | Lys | Asn | Gln | Ser | Leu | Gln | Lys | Ile | Gln | Lys |
| 625 |     |     |     |     | 630 |     |     |     |     | 635 |     |     |     |     | 640 |
| Thr | Pro | Leu | Phe | Val | Ala | Ala | Ile | Cys | Ala | His | Trp | Phe | Gln | Tyr | Pro |
|     |     |     |     | 645 |     |     |     |     | 650 |     |     |     |     | 655 |     |
| Phe | Asp | Pro | Ser | Phe | Asp | Asp | Val | Ala | Val | Phe | Lys | Ser | Tyr | Met | Glu |
|     |     |     | 660 |     |     |     |     | 665 |     |     |     |     | 670 |     |     |
| Arg | Leu | Ser | Leu | Arg | Asn | Lys | Ala | Thr | Ala | Glu | Ile | Leu | Lys | Ala | Thr |
|     |     | 675 |     |     |     |     | 680 |     |     |     |     | 685 |     |     |     |
| Val | Ser | Ser | Cys | Gly | Glu | Leu | Ala | Leu | Lys | Gly | Phe | Phe | Ser | Cys | Cys |
|     | 690 |     |     |     |     | 695 |     |     |     |     | 700 |     |     |     |     |
| Phe | Glu | Phe | Asn | Asp | Asp | Leu | Ala | Glu | Ala | Gly | Val | Asp | Glu | Asp |     |
| 705 |     |     |     | 710 |     |     |     |     | 715 |     |     |     |     | 720 |     |
| Glu | Asp | Leu | Thr | Met | Cys | Leu | Met | Ser | Lys | Phe | Thr | Ala | Gln | Arg | Leu |
|     |     |     |     | 725 |     |     |     |     | 730 |     |     |     |     | 735 |     |
| Arg | Pro | Phe | Tyr | Arg | Phe | Leu | Ser | Pro | Ala | Phe | Gln | Glu | Phe | Leu | Ala |
|     |     |     | 740 |     |     |     |     | 745 |     |     |     |     | 750 |     |     |
| Gly | Met | Arg | Leu | Ile | Glu | Leu | Leu | Asp | Ser | Asp | Arg | Gln | Glu | His | Gln |
|     |     | 755 |     |     |     |     | 760 |     |     |     |     | 765 |     |     |     |
| Asp | Leu | Gly | Leu | Tyr | His | Leu | Lys | Gln | Ile | Asn | Ser | Pro | Met | Met | Thr |
|     | 770 |     |     |     |     | 775 |     |     |     |     | 780 |     |     |     |     |
| Val | Ser | Ala | Tyr | Asn | Asn | Phe | Leu | Asn | Tyr | Val | Ser | Ser | Leu | Pro | Ser |
| 785 |     |     |     | 790 |     |     |     |     |     | 795 |     |     |     |     | 800 |
| Thr | Lys | Ala | Gly | Pro | Lys | Ile | Val | Ser | His | Leu | Leu | His | Leu | Val | Asp |
|     |     |     |     | 805 |     |     |     |     | 810 |     |     |     |     | 815 |     |
| Asn | Lys | Glu | Ser | Leu | Glu | Asn | Ile | Ser | Glu | Asn | Asp | Asp | Tyr | Leu | Lys |
|     |     |     | 820 |     |     |     |     | 825 |     |     |     |     | 830 |     |     |
| His | Gln | Pro | Glu | Ile | Ser | Leu | Gln | Met | Gln | Leu | Leu | Arg | Gly | Leu | Trp |
|     |     | 835 |     |     |     |     | 840 |     |     |     |     | 845 |     |     |     |
| Gln | Ile | Cys | Pro | Gln | Ala | Tyr | Phe | Ser | Met | Val | Ser | Glu | His | Leu | Leu |
|     | 850 |     |     |     |     | 855 |     |     |     |     | 860 |     |     |     |     |
| Val | Leu | Ala | Leu | Lys | Thr | Ala | Tyr | Gln | Ser | Asn | Thr | Val | Ala | Ala | Cys |
| 865 |     |     |     | 870 |     |     |     |     |     | 875 |     |     |     |     | 880 |
| Ser | Pro | Phe | Val | Leu | Gln | Phe | Leu | Gln | Gly | Arg | Thr | Leu | Thr | Leu | Gly |
|     |     |     |     | 885 |     |     |     |     | 890 |     |     |     |     | 895 |     |
| Ala | Leu | Asn | Leu | Gln | Tyr | Phe | Phe | Asp | His | Pro | Glu | Ser | Leu | Ser | Leu |
|     |     |     | 900 |     |     |     |     | 905 |     |     |     |     | 910 |     |     |
| Leu | Arg | Ser | Ile | His | Phe | Pro | Ile | Arg | Gly | Asn | Lys | Thr | Ser | Pro | Arg |
|     |     | 915 |     |     |     |     | 920 |     |     |     |     | 925 |     |     |     |
| Ala | His | Phe | Ser | Val | Leu | Glu | Thr | Cys | Phe | Asp | Lys | Ser | Gln | Val | Pro |
|     | 930 |     |     |     |     | 935 |     |     |     |     | 940 |     |     |     |     |

Thr Ile Asp Gln Asp Tyr Ala Ser Ala Phe Glu Pro Met Asn Glu Trp  
 945 950 955 960  
 Glu Arg Asn Leu Ala Glu Lys Glu Asp Asn Val Lys Ser Tyr Met Asp  
 965 970 975  
 Met Gln Arg Arg Ala Ser Pro Asp Leu Ser Thr Gly Tyr Trp Lys Leu  
 980 985 990  
 Ser Pro Lys Gln Tyr Lys Ile Pro Cys Leu Glu Val Asp Val Asn Asp  
 995 1000 1005  
 Ile Asp Val Val Gly Gln Asp Met Leu Glu Ile Leu Met Thr Val Phe  
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 Ser Ala Ser Gln Arg Ile Glu Leu His Leu Asn His Ser Arg Gly Phe  
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 Ile Glu Ser Ile Arg Pro Ala Leu Glu Leu Ser Lys Ala Ser Val Thr  
 1045 1050 1055  
 Lys Cys Ser Ile Ser Lys Leu Glu Leu Ser Ala Ala Glu Gln Glu Leu  
 1060 1065 1070  
 Leu Leu Thr Leu Pro Ser Leu Glu Ser Leu Glu Val Ser Gly Thr Ile  
 1075 1080 1085  
 Gln Ser Gln Asp Gln Ile Phe Pro Asn Leu Asp Lys Phe Leu Cys Leu  
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 Lys Glu Leu Ser Val Asp Leu Glu Gly Asn Ile Asn Val Phe Ser Val  
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 Ile Pro Glu Glu Phe Pro Asn Phe His His Met Glu Lys Leu Leu Ile  
 1125 1130 1135  
 Gln Ile Ser Ala Glu Tyr Asp Pro Ser Lys Leu Val Lys Leu Ile Gln  
 1140 1145 1150  
 Asn Ser Pro Asn Leu His Val Phe His Leu Lys Cys Asn Phe Phe Ser  
 1155 1160 1165  
 Asp Phe Gly Ser Leu Met Thr Met Leu Val Ser Cys Lys Lys Leu Thr  
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 Glu Ile Lys Phe Ser Asp Ser Phe Phe Gln Ala Val Pro Phe Val Ala  
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 Ser Leu Pro Asn Phe Ile Ser Leu Lys Ile Leu Asn Leu Glu Gly Gln  
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 Gln Phe Pro Asp Glu Glu Thr Ser Glu Lys Phe Ala Tyr Ile Leu Gly  
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 1235 1240 1245  
 Tyr Arg Val Ala Lys Leu Ile Ile Gln Gln Cys Gln Gln Leu His Cys  
 1250 1255 1260  
 Leu Arg Val Leu Ser Phe Phe Lys Thr Leu Asn Asp Asp Ser Val Val  
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 actgcttcct actaaaggac ggacagagca tttgttcttc agccacatac tttccttcca 240  
 ctggccagca ttctcctcta ttagactaga actgtggata aacctcagaa a atg gcc 297

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      |  |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|--|
|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     | Met | Ala  |  |
|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     | 1   |      |  |
| acc | cag | cag | aaa | gcc | tct | gac | gag | agg | atc | tcc | cag | ttt | gat | cac | aat | 345  |  |
| Thr | Gln | Gln | Lys | Ala | Ser | Asp | Glu | Arg | Ile | Ser | Gln | Phe | Asp | His | Asn |      |  |
|     |     | 5   |     |     |     |     | 10  |     |     |     |     | 15  |     |     |     |      |  |
| ttg | ctg | cca | gag | ctg | tct | gct | ctt | ctg | ggc | cta | gat | gca | gtt | cag | ttg | 393  |  |
| Leu | Leu | Pro | Glu | Leu | Ser | Ala | Leu | Leu | Gly | Leu | Asp | Ala | Val | Gln | Leu |      |  |
|     | 20  |     |     |     |     | 25  |     |     |     |     | 30  |     |     |     |     |      |  |
| gca | aag | gaa | cta | gaa | gaa | gag | gag | cag | aag | gag | cga | gca | aaa | atg | cag | 441  |  |
| Ala | Lys | Glu | Leu | Glu | Glu | Glu | Glu | Gln | Lys | Glu | Arg | Ala | Lys | Met | Gln |      |  |
| 35  |     |     |     | 40  |     |     |     |     |     | 45  |     |     |     | 50  |     |      |  |
| aaa | ggc | tac | aac | tct | caa | atg | cgc | agt | gaa | gca | aaa | agg | tta | aag | act | 489  |  |
| Lys | Gly | Tyr | Asn | Ser | Gln | Met | Arg | Ser | Glu | Ala | Lys | Arg | Leu | Lys | Thr |      |  |
|     |     |     | 55  |     |     |     |     | 60  |     |     |     |     |     | 65  |     |      |  |
| ttt | gtg | act | tat | gag | ccg | tac | agc | tca | tgg | ata | cca | cag | gag | atg | gcg | 537  |  |
| Phe | Val | Thr | Tyr | Glu | Pro | Tyr | Ser | Ser | Trp | Ile | Pro | Gln | Glu | Met | Ala |      |  |
|     |     | 70  |     |     |     |     |     | 75  |     |     |     |     | 80  |     |     |      |  |
| gcc | gct | ggg | ttt | tac | ttc | act | ggg | gta | aaa | tct | ggg | att | cag | tgc | ttc | 585  |  |
| Ala | Ala | Gly | Phe | Tyr | Phe | Thr | Gly | Val | Lys | Ser | Gly | Ile | Gln | Cys | Phe |      |  |
|     |     | 85  |     |     |     |     | 90  |     |     |     |     | 95  |     |     |     |      |  |
| tgc | tgt | agc | cta | atc | ctc | ttt | ggt | gcc | ggc | ctc | acg | aga | ctc | ccc | ata | 633  |  |
| Cys | Cys | Ser | Leu | Ile | Leu | Phe | Gly | Ala | Gly | Leu | Thr | Arg | Leu | Pro | Ile |      |  |
|     | 100 |     |     |     |     | 105 |     |     |     |     | 110 |     |     |     |     |      |  |
| gaa | gac | cac | aag | agg | ttt | cat | cca | gat | tgt | ggg | ttc | ctt | ttg | aac | aag | 681  |  |
| Glu | Asp | His | Lys | Arg | Phe | His | Pro | Asp | Cys | Gly | Phe | Leu | Leu | Asn | Lys |      |  |
| 115 |     |     |     |     | 120 |     |     |     | 125 |     |     |     |     | 130 |     |      |  |
| gat | gtt | ggt | aac | att | gcc | aag | tac | gac | ata | agg | gtg | aag | aat | ctg | aag | 729  |  |
| Asp | Val | Gly | Asn | Ile | Ala | Lys | Tyr | Asp | Ile | Arg | Val | Lys | Asn | Leu | Lys |      |  |
|     |     |     | 135 |     |     |     |     | 140 |     |     |     |     |     | 145 |     |      |  |
| agc | agg | ctg | aga | gga | ggt | aaa | atg | agg | tac | caa | gaa | gag | gag | gct | aga | 777  |  |
| Ser | Arg | Leu | Arg | Gly | Gly | Lys | Met | Arg | Tyr | Gln | Glu | Glu | Glu | Ala | Arg |      |  |
|     |     | 150 |     |     |     |     |     | 155 |     |     |     | 160 |     |     |     |      |  |
| ctt | gca | tcc | ttc | agg | aac | tgg | cca | ttt | tat | gtc | caa | ggg | ata | tcc | cct | 825  |  |
| Leu | Ala | Ser | Phe | Arg | Asn | Trp | Pro | Phe | Tyr | Val | Gln | Gly | Ile | Ser | Pro |      |  |
|     |     | 165 |     |     |     |     | 170 |     |     |     |     | 175 |     |     |     |      |  |
| tgt | gtg | ctc | tca | gag | gct | ggc | ttt | gtc | ttt | aca | ggt | aaa | cag | gac | acg | 873  |  |
| Cys | Val | Leu | Ser | Glu | Ala | Gly | Phe | Val | Phe | Thr | Gly | Lys | Gln | Asp | Thr |      |  |
|     | 180 |     |     |     |     | 185 |     |     |     |     | 190 |     |     |     |     |      |  |
| gta | cag | tgt | ttt | tcc | tgt | ggt | gga | tgt | tta | gga | aat | tgg | gaa | gaa | gga | 921  |  |
| Val | Gln | Cys | Phe | Ser | Cys | Gly | Gly | Cys | Leu | Gly | Asn | Trp | Glu | Glu | Gly |      |  |
| 195 |     |     |     |     | 200 |     |     |     | 205 |     |     |     |     | 210 |     |      |  |
| gat | gat | cct | tgg | aag | gaa | cat | gcc | aaa | tgg | ttc | ccc | aaa | tgt | gaa | ttt | 969  |  |
| Asp | Asp | Pro | Trp | Lys | Glu | His | Ala | Lys | Trp | Phe | Pro | Lys | Cys | Glu | Phe |      |  |
|     |     |     | 215 |     |     |     |     | 220 |     |     |     |     | 225 |     |     |      |  |
| ctt | cgg | agt | aag | aaa | tcc | tca | gag | gaa | att | acc | cag | tat | att | caa | agc | 1017 |  |
| Leu | Arg | Ser | Lys | Lys | Ser | Ser | Glu | Glu | Ile | Thr | Gln | Tyr | Ile | Gln | Ser |      |  |
|     |     | 230 |     |     |     |     | 235 |     |     |     |     |     | 240 |     |     |      |  |
| tac | aag | gga | ttt | gtt | gac | ata | acg | gga | gaa | cat | ttt | gtg | aat | tcc | tgg | 1065 |  |
| Tyr | Lys | Gly | Phe | Val | Asp | Ile | Thr | Gly | Glu | His | Phe | Val | Asn | Ser | Trp |      |  |
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| gtc | cag | aga | gaa | tta | cct | atg | gca | tca | gct | tat | tgc | aat | gac | agc | atc | 1113 |  |
| Val | Gln | Arg | Glu | Leu | Pro | Met | Ala | Ser | Ala | Tyr | Cys | Asn | Asp | Ser | Ile |      |  |
|     | 260 |     |     |     |     | 265 |     |     |     |     | 270 |     |     |     |     |      |  |
| ttt | gct | tac | gaa | gaa | cta | cgg | ctg | gac | tct | ttt | aag | gac | tgg | ccc | cgg | 1161 |  |
| Phe | Ala | Tyr | Glu | Glu | Leu | Arg | Leu | Asp | Ser | Phe | Lys | Asp | Trp | Pro | Arg |      |  |
| 275 |     |     |     | 280 |     |     |     |     | 285 |     |     |     |     | 290 |     |      |  |
| gaa | tca | gct | gtg | gga | gtt | gca | gca | ctg | gcc | aaa | gca | ggt | ctt | ttc | tac | 1209 |  |
| Glu | Ser | Ala | Val | Gly | Val | Ala | Ala | Leu | Ala | Lys | Ala | Gly | Leu | Phe | Tyr |      |  |
|     |     |     | 295 |     |     |     |     | 300 |     |     |     |     | 305 |     |     |      |  |
| aca | ggt | ata | aag | gac | atc | gtc | cag | tgc | ttt | tcc | tgt | gga | ggg | tgt | tta | 1257 |  |
| Thr | Gly | Ile | Lys | Asp | Ile | Val | Gln | Cys | Phe | Ser | Cys | Gly | Gly | Cys | Leu |      |  |
|     |     | 310 |     |     |     |     | 315 |     |     |     |     | 320 |     |     |     |      |  |
| gag | aaa | tgg | cag | gaa | ggt | gat | gac | cca | tta | gac | gat | cac | acc | aga | tgt | 1305 |  |
|     |     |     |     |     |     |     |     |     |     | 12  |     |     |     |     |     |      |  |

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |      |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| Glu | Lys | Trp | Gln | Glu | Gly | Asp | Asp | Pro | Leu | Asp | Asp | His | Thr | Arg | Cys |      |
| 325 |     |     |     |     |     |     | 330 |     |     |     |     | 335 |     |     |     |      |
| ttt | ccc | aat | tgt | cca | ttt | ctc | caa | aat | atg | aag | tcc | tct | gcg | gaa | gtg | 1353 |
| Phe | Pro | Asn | Cys | Pro | Phe | Leu | Gln | Asn | Met | Lys | Ser | Ser | Ala | Glu | Val |      |
| 340 |     |     |     |     |     | 345 |     |     |     |     | 350 |     |     |     |     |      |
| act | cca | gac | ctt | cag | agc | cgt | ggg | gaa | ctt | tgt | gaa | tta | ctg | gaa | acc | 1401 |
| Thr | Pro | Asp | Leu | Gln | Ser | Arg | Gly | Glu | Leu | Cys | Glu | Leu | Leu | Glu | Thr |      |
| 355 |     |     |     |     | 360 |     |     |     |     | 365 |     |     |     |     | 370 |      |
| aca | agt | gaa | agc | aat | ctt | gaa | gat | tca | ata | gca | ggt | ggg | cct | ata | gtg | 1449 |
| Thr | Ser | Glu | Ser | Asn | Leu | Glu | Asp | Ser | Ile | Ala | Val | Gly | Pro | Ile | Val |      |
| 375 |     |     |     |     |     |     |     |     | 380 |     |     |     |     | 385 |     |      |
| cca | gaa | atg | gca | cag | ggg | gaa | gcc | cag | tgg | ttt | caa | gag | gca | aag | aat | 1497 |
| Pro | Glu | Met | Ala | Gln | Gly | Glu | Ala | Gln | Trp | Phe | Gln | Glu | Ala | Lys | Asn |      |
| 390 |     |     |     |     |     |     |     | 395 |     |     |     |     | 400 |     |     |      |
| ctg | aat | gag | cag | ctg | aga | gca | gct | tat | acc | agc | gcc | agt | ttc | cgc | cac | 1545 |
| Leu | Asn | Glu | Gln | Leu | Arg | Ala | Ala | Tyr | Thr | Ser | Ala | Ser | Phe | Arg | His |      |
| 405 |     |     |     |     |     | 410 |     |     |     |     |     | 415 |     |     |     |      |
| atg | tct | ttg | ctt | gat | atc | tct | tcc | gat | ctg | gcc | acg | gac | cac | ttg | ctg | 1593 |
| Met | Ser | Leu | Leu | Asp | Ile | Ser | Ser | Asp | Leu | Ala | Thr | Asp | His | Leu | Leu |      |
| 420 |     |     |     |     |     | 425 |     |     |     |     | 430 |     |     |     |     |      |
| ggc | tgt | gat | ctg | tct | att | gct | tca | aaa | cac | atc | agc | aaa | cct | gtg | caa | 1641 |
| Gly | Cys | Asp | Leu | Ser | Ile | Ala | Ser | Lys | His | Ile | Ser | Lys | Pro | Val | Gln |      |
| 435 |     |     |     |     | 440 |     |     |     |     | 445 |     |     |     |     | 450 |      |
| gaa | cct | ctg | gtg | ctg | cct | gag | gtc | ttt | ggc | aac | ttg | aac | tct | gtc | atg | 1689 |
| Glu | Pro | Leu | Val | Leu | Pro | Glu | Val | Phe | Gly | Asn | Leu | Asn | Ser | Val | Met |      |
| 455 |     |     |     |     |     |     |     | 460 |     |     |     |     |     | 465 |     |      |
| tgt | gtg | gag | ggg | gaa | gct | gga | agt | gga | aag | acg | gtc | ctc | ctg | aag | aaa | 1737 |
| Cys | Val | Glu | Gly | Glu | Ala | Gly | Ser | Gly | Lys | Thr | Val | Leu | Leu | Lys | Lys |      |
| 470 |     |     |     |     |     |     |     | 475 |     |     |     |     | 480 |     |     |      |
| ata | gct | ttt | ctg | tgg | gca | tct | gga | tgc | tgt | ccc | ctg | tta | aac | agg | ttc | 1785 |
| Ile | Ala | Phe | Leu | Trp | Ala | Ser | Gly | Cys | Cys | Pro | Leu | Leu | Asn | Arg | Phe |      |
| 485 |     |     |     |     |     |     | 490 |     |     |     |     | 495 |     |     |     |      |
| cag | ctg | gtt | ttc | tac | ctc | tcc | ctt | agt | tcc | acc | aga | cca | gac | gag | ggg | 1833 |
| Gln | Leu | Val | Phe | Tyr | Leu | Ser | Leu | Ser | Ser | Thr | Arg | Pro | Asp | Glu | Gly |      |
| 500 |     |     |     |     |     | 505 |     |     |     |     | 510 |     |     |     |     |      |
| ctg | gcc | agt | atc | atc | tgt | gac | cag | ctc | cta | gag | aaa | gaa | gga | tct | gtt | 1881 |
| Leu | Ala | Ser | Ile | Ile | Cys | Asp | Gln | Leu | Leu | Glu | Lys | Glu | Gly | Ser | Val |      |
| 515 |     |     |     |     | 520 |     |     |     |     | 525 |     |     |     |     | 530 |      |
| act | gaa | atg | tgc | atg | agg | aac | att | atc | cag | cag | tta | aag | aat | cag | gtc | 1929 |
| Thr | Glu | Met | Cys | Met | Arg | Asn | Ile | Ile | Gln | Gln | Leu | Lys | Asn | Gln | Val |      |
| 535 |     |     |     |     |     |     |     |     | 540 |     |     |     |     | 545 |     |      |
| tta | ttc | ctt | tta | gat | gac | tac | aaa | gaa | ata | tgt | tca | atc | cct | caa | gtc | 1977 |
| Leu | Phe | Leu | Leu | Asp | Asp | Tyr | Lys | Glu | Ile | Cys | Ser | Ile | Pro | Gln | Val |      |
| 550 |     |     |     |     |     |     |     | 555 |     |     |     |     | 560 |     |     |      |
| ata | gga | aaa | ctg | att | caa | aaa | aac | cac | tta | tcc | cgg | acc | tgc | cta | ttg | 2025 |
| Ile | Gly | Lys | Leu | Ile | Gln | Lys | Asn | His | Leu | Ser | Arg | Thr | Cys | Leu | Leu |      |
| 565 |     |     |     |     |     | 570 |     |     |     |     |     | 575 |     |     |     |      |
| att | gct | gtc | cgt | aca | aac | agg | agg | gac | atc | cgc | cga | tac | cta | gag |     | 2073 |
| Ile | Ala | Val | Arg | Thr | Asn | Arg | Ala | Arg | Asp | Ile | Arg | Arg | Tyr | Leu | Glu |      |
| 580 |     |     |     |     |     | 585 |     |     |     |     | 590 |     |     |     |     |      |
| acc | att | cta | gag | atc | aaa | gca | ttt | ccc | ttt | tat | aat | act | gtc | tgt | ata | 2121 |
| Thr | Ile | Leu | Glu | Ile | Lys | Ala | Phe | Pro | Phe | Tyr | Asn | Thr | Val | Cys | Ile |      |
| 595 |     |     |     |     | 600 |     |     |     |     | 605 |     |     |     |     | 610 |      |
| tta | cgg | aag | ctc | ttt | tca | cat | aat | atg | act | cgt | ctg | cga | aag | ttt | atg | 2169 |
| Leu | Arg | Lys | Leu | Phe | Ser | His | Asn | Met | Thr | Arg | Leu | Arg | Lys | Phe | Met |      |
| 615 |     |     |     |     |     |     |     |     | 620 |     |     |     |     | 625 |     |      |
| gtt | tac | ttt | gga | aag | aac | caa | agt | ttg | cag | aag | ata | cag | aaa | act | cct | 2217 |
| Val | Tyr | Phe | Gly | Lys | Asn | Gln | Ser | Leu | Gln | Lys | Ile | Gln | Lys | Thr | Pro |      |
| 630 |     |     |     |     |     |     |     | 635 |     |     |     |     | 640 |     |     |      |
| ctc | ttt | gtg | gcg | gcg | atc | tgt | gct | cat | tgg | ttt | cag | tat | cct | ttt | gac | 2265 |
| Leu | Phe | Val | Ala | Ala | Ile | Cys | Ala | His | Trp | Phe | Gln | Tyr | Pro | Phe | Asp |      |
| 645 |     |     |     |     |     | 650 |     |     |     |     |     | 655 |     |     |     |      |
| cca | tcc | ttt | gat | gat | gtg | gct | gtt | ttc | aag | tcc | tat | atg | gaa | cgc | ctt | 2313 |
| Pro | Ser | Phe | Asp | Asp | Val | Ala | Val | Phe | Lys | Ser | Tyr | Met | Glu | Arg | Leu |      |

|   |   |      |      |      |
|---|---|------|------|------|
| 660   | tcc tta agg aac aaa gcg aca gct gaa att ctc aaa gca act gtg tcc | 665  | 670  | 2361 |
| Ser Leu Arg Asn Lys Ala Thr Ala Glu Ile Leu Lys Ala Thr Val Ser |   |      |      |      |
| 675   | 680   | 685  | 690  |      |
| tcc tgt ggt gag ctg gcc ttg aaa ggg ttt ttt tca tgt tgc ttt gag |   |      |      | 2409 |
| Ser Cys Gly Glu Leu Ala Leu Lys Gly Phe Phe Ser Cys Cys Phe Glu |   |      |      |      |
| 695   | 700   | 705  |      |      |
| ttt aat gat gat gat ctc gca gaa gca ggg gtt gat gaa gat gaa gat |   |      |      | 2457 |
| Phe Asn Asp Asp Asp Leu Ala Glu Ala Gly Val Asp Glu Asp Glu Asp |   |      |      |      |
| 710   | 715   | 720  |      |      |
| cta acc atg tgc ttg atg agc aaa ttt aca gcc cag aga cta aga cca |   |      |      | 2505 |
| Leu Thr Met Cys Leu Met Ser Lys Phe Thr Ala Gln Arg Leu Arg Pro |   |      |      |      |
| 725   | 730   | 735  |      |      |
| ttc tac cgg ttt tta agt cct gcc ttc caa gaa ttt ctt gcg ggg atg |   |      |      | 2553 |
| Phe Tyr Arg Phe Leu Ser Pro Ala Phe Gln Glu Phe Leu Ala Gly Met |   |      |      |      |
| 740   | 745   | 750  |      |      |
| agg ctg att gaa ctc ctg gat tca gat agg cag gaa cat caa gat ttg |   |      |      | 2601 |
| Arg Leu Ile Glu Leu Leu Asp Ser Asp Arg Glu His Gln Asp Leu     |   |      |      |      |
| 755   | 760   | 765  | 770  |      |
| gga ctg tat cat ttg aaa caa atc aac tca ccc atg atg act gta agc |   |      |      | 2649 |
| Gly Leu Tyr His Leu Lys Gln Ile Asn Ser Pro Met Met Thr Val Ser |   |      |      |      |
| 775   | 780   | 785  |      |      |
| gcc tac aac aat ttt ttg aac tat gtc tcc agc ctc cct tca aca aaa |   |      |      | 2697 |
| Ala Tyr Asn Asn Phe Leu Asn Tyr Val Ser Ser Leu Pro Ser Thr Lys |   |      |      |      |
| 790   | 795   | 800  |      |      |
| gca ggg ccc aaa att gtg tct cat ttg ctc cat tta gtg gat aac aaa |   |      |      | 2745 |
| Ala Gly Pro Lys Ile Val Ser His Leu Leu His Leu Val Asp Asn Lys |   |      |      |      |
| 805   | 810   | 815  |      |      |
| gag tca ttg gag aat ata tct gaa aat gat gac tac tta aag cac cag |   |      |      | 2793 |
| Glu Ser Leu Glu Asn Ile Ser Glu Asn Asp Asp Tyr Leu Lys His Gln |   |      |      |      |
| 820   | 825   | 830  |      |      |
| cca gaa att tca ctg cag atg cag tta ctt agg gga ttg tgg caa att |   |      |      | 2841 |
| Pro Glu Ile Ser Leu Gln Met Gln Leu Leu Arg Gly Leu Trp Gln Ile |   |      |      |      |
| 835   | 840   | 845  | 850  |      |
| tgt cca caa gct tac ttt tca atg gtt tca gaa cat tta ctg gtt ctt |   |      |      | 2889 |
| Cys Pro Gln Ala Tyr Phe Ser Met Val Ser Glu His Leu Leu Val Leu |   |      |      |      |
| 855   | 860   | 865  |      |      |
| gcc ctg aaa act gct tat caa agc aac act gtt gct gcg tgt tct cca |   |      |      | 2937 |
| Ala Leu Lys Thr Ala Tyr Gln Ser Asn Thr Val Ala Ala Cys Ser Pro |   |      |      |      |
| 870   | 875   | 880  |      |      |
| ttt gtt ttg caa ttc ctt caa ggg aga aca ctg act ttg ggt gcg ctt |   |      |      | 2985 |
| Phe Val Leu Gln Phe Leu Gln Gly Arg Thr Leu Thr Leu Gly Ala Leu |   |      |      |      |
| 885   | 890   | 895  |      |      |
| aac tta cag tac ttt ttc gac cac cca gaa agc ttg tca ttg ttg agg |   |      |      | 3033 |
| Asn Leu Gln Tyr Phe Phe Asp His Pro Glu Ser Leu Ser Leu Leu Arg |   |      |      |      |
| 900   | 905   | 910  |      |      |
| agc atc cac ttc cca ata cga gga aat aag aca tca ccc aga gca cat |   |      |      | 3081 |
| Ser Ile His Phe Pro Ile Arg Gly Asn Lys Thr Ser Pro Arg Ala His |   |      |      |      |
| 915   | 920   | 925  | 930  |      |
| ttt tca gtt ctg gaa aca tgt ttt gac aaa tca cag gtg cca act ata |   |      |      | 3129 |
| Phe Ser Val Leu Glu Thr Cys Phe Asp Lys Ser Gln Val Pro Thr Ile |   |      |      |      |
| 935   | 940   | 945  |      |      |
| gat cag gac tat gct tct gcc ttt gaa cct atg aat gaa tgg gag cga |   |      |      | 3177 |
| Asp Gln Asp Tyr Ala Ser Ala Phe Glu Pro Met Asn Glu Trp Glu Arg |   |      |      |      |
| 950   | 955   | 960  |      |      |
| aat tta gct gaa aaa gag gat aat gta aag agc tat atg gat atg cag |   |      |      | 3225 |
| Asn Leu Ala Glu Lys Glu Asp Asn Val Lys Ser Tyr Met Asp Met Gln |   |      |      |      |
| 965   | 970   | 975  |      |      |
| cgc agg gca tca cca gac ctt agt act ggc tat tgg aaa ctt tct cca |   |      |      | 3273 |
| Arg Arg Ala Ser Pro Asp Leu Ser Thr Gly Tyr Trp Lys Leu Ser Pro |   |      |      |      |
| 980   | 985   | 990  |      |      |
| aag cag tac aag att ccc tgt cta gaa gtc gat gtg aat gat att gat |   |      |      | 3321 |
| Lys Gln Tyr Lys Ile Pro Cys Leu Glu Val Asp Val Asn Asp Ile Asp |   |      |      |      |
| 995   | 1000  | 1005 | 1010 |      |

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 1045 1050 1055  
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| aatggtgtga | acccgggagg | tggagcttga | agtgagccaa | gatcatgcca | ctgcactcca | 5319 |
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